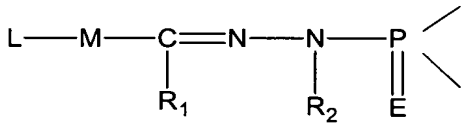
CLAIMS

1. A solid support, characterized in that it comprises at least one surface covalently functionalized with phosphorus-containing dendrimers having a central core that contains at least two functional groups and comprising at their periphery several functions capable of allowing the binding of said dendrimers to said surface and also the binding or the *in situ* synthesis of molecules of interest, said dendrimers being between 1 and 20 nm in size.

2. The solid support as claimed in claim 1, characterized in that the dendrimers are chosen from those consisting of:

- a central layer in the form of a central core P_0, optionally containing phosphorus, comprising from 2 to 12 functionalized groups,
- n intermediate layers, which may be identical or different, each of said intermediate layers consisting of P_1 units corresponding to formula (I) below:



(I)

in which:

L is an oxygen, phosphorus, sulfur or nitrogen atom,

M represents one of the following groups:

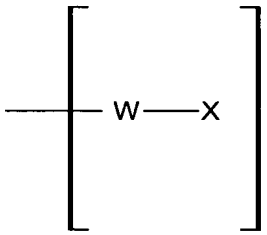
- an aromatic group di-, tri- or tetrasubstituted with alkyl groups, alkoxy groups, unsaturated groups of the C_1-C_{12} olefinic, azo or acetylenic type, all these groups possibly incorporating phosphorus, oxygen, nitrogen or sulfur atoms or halogens, or
- an alkyl or alkoxy group comprising several substituents as defined when M is an aromatic group,

R_1 and R_2, which may be identical or different, represent a hydrogen atom or one of the following groups: alkyl, alkoxy, aryl, optionally comprising phosphorus, oxygen, sulfur or nitrogen atoms or halogens with R_2 usually being different than R_1,

n is an integer between 1 and 11,

E is an oxygen, sulfur or nitrogen atom, said nitrogen atom possibly being linked to an alkyl, alkoxy or aryl group, all these groups possibly incorporating phosphorus, oxygen, nitrogen or sulfur atoms or halogens,

- an external layer consisting of units P_2, which may be identical or different, and corresponding to formula II below:



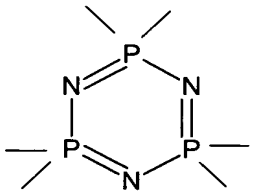
(II)

in which:

W represents one of the following groups: alkyl, alkoxy, aryl, all these groups possibly comprising phosphorus, oxygen, nitrogen or sulfur atoms or halogens,

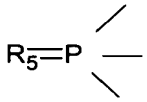
X represents an aldehyde, thiol, amine, epoxide, carboxylic acid, alcohol or phenol group.

3. The solid support as claimed in claim 2, characterized in that the central core P_0 is selected from the group consisting of the group of general formula IIIa:



(IIIa)

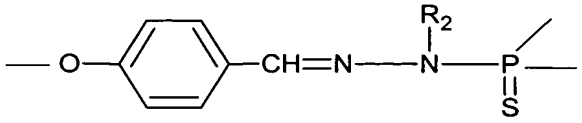
and the group of general formula IIIb:



(IIIb)

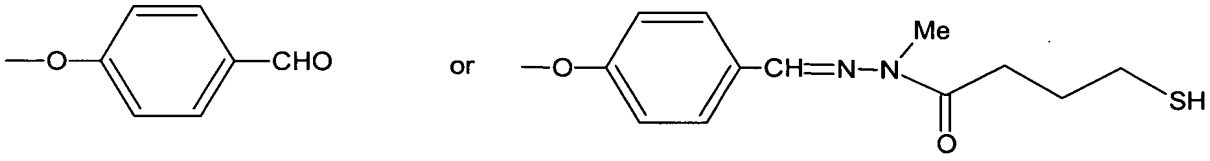
in which R_5 represents a sulfur, oxygen or nitrogen atom.

4. The support as claimed in claim 2 or 3, characterized in that the dendrimers are chosen from compounds in which the group of formula (I) represents the following group:



in which R_2 represents a C_1-C_{12} alkyl radical and more particularly a methyl radical;

and the group of formula (II) represents one of the following two groups:



and in which the number of generations preferably ranges between 1 and 6.

5. The solid support as claimed in any one of the preceding claims, characterized in that it is chosen from supports comprising at least one siliceous surface, such as glass slides, beads and capillaries, silicon or plastic supports and metallic supports.

6. A process for preparing a solid support as defined in any one of claims 1 to 5, characterized in that it comprises a step of forming a covalent bond between phosphorus-containing dendrimers having a central core that contains at least two functional groups, said dendrimers comprising at their periphery several functions capable of allowing their binding to said surface and the binding or the *in situ* synthesis of molecules of interest, and the functionalized or nonfunctionalized surface of a solid support to obtain a solid support covalently functionalized with said dendrimers.

7. The process as claimed in claim 6, characterized in that the dendrimers comprise at their periphery functions allowing the direct attachment, via a

covalent bond, of these dendrimers to the non-prefunctionalized surface of said solid support.

8. The process as claimed in claim 7, characterized in that the dendrimers comprise thiol functions at their periphery and in that the solid support comprises a gold surface.

9. The process as claimed in claim 6, in which the surface of the solid support used does not comprise any functions that are compatible with the peripheral functions of the dendrimer used, characterized in that it comprises the following steps:

a) the functionalization of at least one surface of a solid support with functions capable of allowing the binding of phosphorus-containing dendrimers having a central core that contains at least two functional groups, said dendrimers comprising at their periphery several functions capable of allowing their binding to said surface thus functionalized and the binding or the *in situ* synthesis of molecules of interest;

b) the optional preactivation of the functions of the support to obtain an activated functionalized surface,

c) the formation of a covalent bond between said dendrimers and said functionalized and optionally activated surface, to obtain a solid support covalently functionalized with said dendrimers.

10. The process as claimed in claim 9, characterized in that the step a) of functionalization of the surface of the solid support is performed by silanization using a silanization reagent comprising functions capable of binding dendrimers, for instance amine groups.

11. The process as claimed in claim 9 or 10, characterized in that the silanization reagent is aminated.

12. The process as claimed in any one of claims 9 to 11, characterized in that the preactivation step is performed by treating the support with a basifying agent for a period of between 2 and 20 minutes.

13. Process according to any one of claims 6 to 12, characterized in that the step of covalent binding of the dendrimers consists in:

- preparing a solution of said dendrimers in a solvent,

- placing said dendrimer solution in contact with the optionally functionalized and optionally activated surface, for a period of between 10 minutes and 24 hours.

14. The process as claimed in any one of claims 6 to 13, characterized in that after the step of covalent binding of the dendrimers, the supports are rinsed and then dried.

15. The use of a solid support functionalized with phosphorus-containing dendrimers as defined in any one of claims 1 to 5, as a support for the immobilization and/or *in situ* synthesis of molecules of interest.

16. The use as claimed in claim 15, characterized in that the molecules of interest are nucleic acid molecules, lipids, proteins or molecular partners thereof.

17. A biochip or dendrichip, characterized in that it consists of a solid support comprising at least one surface functionalized with phosphorus-containing dendrimers and as defined in any one of claims 1 to 5, to which are covalently bound molecules of interest.

18. The biochip as claimed in claim 17, characterized in that it is reusable.

19. A process for preparing a biochip as defined in claim 17 or 18, characterized in that it consists in placing a solid support, containing at least one surface functionalized with phosphorus-containing dendrimers comprising at their periphery functions capable of allowing the covalent binding of molecules of interest, in contact with a buffer solution containing molecules of interest that have been prefunctionalized with, or that already comprise, one or more groups capable of forming a covalent bond with said peripheral functions of the dendrimers.

20. The process as claimed in claim 19, characterized in that the peripheral functions of the dendrimers used are aldehyde functions, and in that the molecules of interest are prefunctionalized with, or already contain, one or more amine functions, or are prefunctionalized with one or more oxyamine ($-ONH_2$) or hydrazine ($-NH-NH_2$) functions.

21. The process as claimed in claim 20, characterized in that the molecules of interest are prefunctionalized with, or already contain, one or more

amine functions and in that the step of binding the molecules of interest is followed by a step of reduction of the imine functions.

22. The process as claimed in claim 19, characterized in that the peripheral functions of the dendrimers used are thiol functions, and in that the molecules of interest are prefunctionalized with, or already contain, one or more thiol functions or are functionalized with one or more iodoacetamido (-NHCO-CH_2-I) functions.

23. The process as claimed in claim 19, characterized in that the peripheral functions of the dendrimers used are amine functions, and in that the molecules of interest are prefunctionalized with, or already contain, one or more aldehyde, α-oxoaldehyde, -COOR, -NCS or -NHS functions.

24. The process as claimed in claim 19, characterized in that the peripheral functions of the dendrimers used are epoxide functions, and in that the molecules of interest are prefunctionalized with, or already contain, one or more amine functions.

25. The process as claimed in any one of claims 19 to 24, characterized in that the reaction for the covalent binding of the molecules of interest to the dendrislides is performed at a temperature of between 4 and 50°C, for a period of between 2 and 24 hours.

26. The use of a dendrichip as claimed in claim 17 or 18, as DNA, peptide, polypeptide or protein chips.